

A new *Anterhynchium* species from Japan, with a key to the Northeast Asian species of the genus (Hymenoptera, Eumenidae)

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Abstract

A new species of the eumenid genus *Anterhynchium* is described from Japan. This new species, *A. gibbifrons* sp. n., was not noticed by Japanese hymenopterists until recently, but in these three years it has been found to be rather common in Fukui Prefecture, Honshu, Japan. A key to the Northeast Asian species of the genus *Anterhynchium* is presented, and discrimination of the four species is discussed.

Key words: *Anterhynchium*, new species, Japan, key to species, distribution.

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Introduction

The genus *Anterhynchium* Saussure, 1863 consists of three subgenera, i.e., *Anterhynchium*, *Dirhynchium* van der Vecht, 1963, and *Epiodynerus* Giordani Soika, 1958. The genus is distributed mainly in the Old World tropics (van der Vecht, 1963) and composed of 40 species world-wide (J. M. Carpenter, personal communication). All the forms found in Northeast Asia belong to the subgenus *Dirhynchium* (Yamane, 1990; Kim, 2014). Although Giordani Soika (1986) described a Japanese species, *Anterhynchium kogimai*, as belonging to *Epiodynerus*, this species actually belongs to another genus, *Okinawepipona* (Yamane, 1987). Up to now three species have been known for *Anterhynchium* in Northeast Asia, namely *A. flavomarginatum* (Smith, 1852), *A. flavopunctatum* (Smith, 1852), and *A. melanopterum* Yamane, 1981. A new species is herein described from Japan.

Materials and Methods

Collection data for the new species are given in 'Specimens examined'. For *A. flavopunctatum* one female identified by Dr. J. van der Vecht (Hangchow, China, 20.vii.1924, J. F. Illingworth leg.) and two males identified by Dr. A. Giordani Soika (Fukien, China, viii.1946,

Tschung-Sen leg.) were examined.

The body length is given as a total length of the head, mesosoma, metasomal tergites 1 and 2, and roughly measured with naked eyes using an ordinary ruler. The head width and clypeal width (CW) and length (height) (CL) were measured with an ocular micrometer under a binocular microscope to the nearest second decimal. CW was measured excluding the 'wings of clypeus' sensu Richards (1962, pp. 10-11) or lateral lobe sensu Kim (2014, p. 32, Fig. 5C) (Fig. 14). CW/CL was calculated to show relative widths of the clypeus.

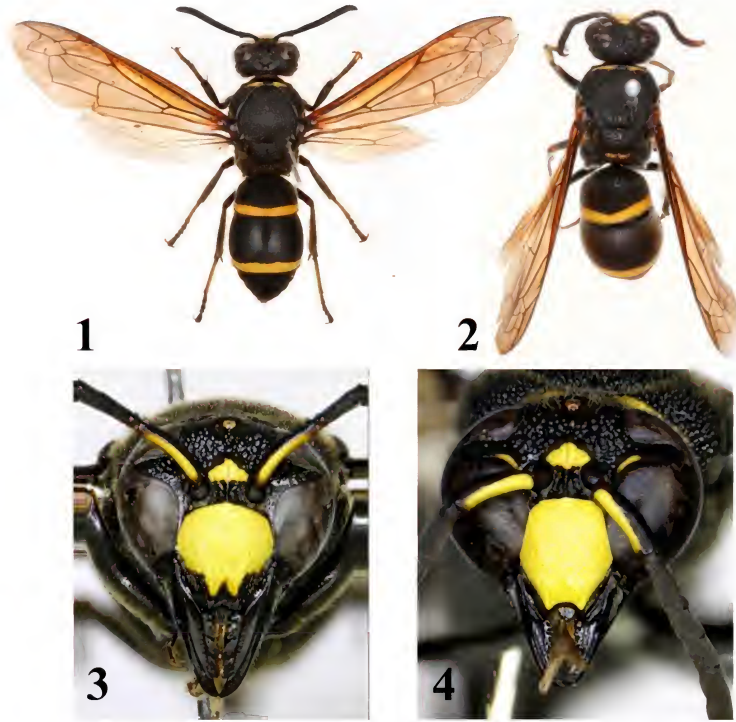
Collector names are abbreviated as follows: Hideyoshi Kurokawa (HK), Tadao Murota (TM), Tadashi Tano (TT).

***Anterhynchium gibbifrons* Yamane et Murota, sp. n.**

(Figs. 1-4, 15, 18)

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Specimens examined. Holotype. ♀, Wada-chô, Sabae-shi, Fukui-ken, Honshu, Japan, 12.vii.2014, T. Murota (Entomological Collection, Hokkaido University, Japan).



Figs. 1-4. *Anterhynchium gibbifrons* sp. n. 1, 3. Female, Inzai-shi, Chiba-ken, Honshu; 2, 4. Male, Katsuyama-shi, Fukui Pref.

Paratypes. 3♀9♂, 12-17.vii.2014, same loc., T. Murota (Entomological Collection, Hokkaido University; Kyushu University Museum, Japan; Hyogo Prefectural Museum, Japan; Osaka City Museum of Natural History, Japan; J.-K. Kim Collection, Korea).

Non-type material. Chiba-ken, Honshu: 1♀, Matsumushi, Inzai-shi, 23.vi.2013, H. Suda (SY14001). Fukui-ken, Honshu: 3♂, Hamasaka, Awara-shi, 9.vii.2013, TM & HK; 11♂, same loc., 11.vii.2013, TM; 6♂, Kashizu, Echizen-chô, 18.vii.2014, TM; 4♂, Nozue, Echizen-chô, 17.vii.2014, TM; 5♂, Oimatsu, Echizen-chô, 18.vii.2014, TM; 3♂, Shimoyamanaka, Echizen-shi, 18.vii.2014, TM; 6♂, Tera, Echizen-chô, 17.vii.2014, TM; 2♂, same loc., 18.viii.2014, TM; 4♂, Tsuetate, Echizen-chô, 17.vii.2014, TM; 7♂, Uwado, Echizen-chô, 18.vii.2014, TM; 3♀, Asuwayama, Fuki-shi, 28.vii.2014, HK; 6♂, Futatsuya, Fukui-shi, 17-19.vii.2014, TM; 2♂,

Ichinose chô, Fukui-shi, 20.vii.2014, TM; 1♂, Ichiôji chô, Fukui-shi, 19.vii.2014, HK; 2♀, Kamiikari-chô, Fukui-shi, 18.viii.2014, TM; 4♂, Kazao-chô, Fukui-shi, 19.vii.2014, TM; 11♂, Ohmori-chô, Fukui-shi, 17-18.vii.2014, TM & HK; 2♀2♂, same loc., 5.viii.2014, HK; 1♀8♂, Ohtani-chô, Fukui-shi, 20.vii.2014, TM; 1♀, same loc., 18.viii.2014, TM; 7♂, Sano, Fukui-shi, 16-19.vii.2014, HK; 6♂, Sanrihama, Fukui-shi, 11.vii.2013, TM; 1♂, same loc., 20.vii.2013, HK; 2♂, Shimizubata-chô, Fukui-shi, 16.vii.2014, HK; 1♀4♂, same loc., 28.vii.2014, HK; 7♂, Shirakata-chô, Fukui-shi, 1.vii.2014, T. Murota; 3♀8♂, same loc., 8-12.vii.2014, T. Murota & H. Kurokawa; 1♀, same loc., 20.vii.2014, TM; 2♀, Higashino, Kitagô-chô, Katsuyama-shi, 10.viii.2014, TT; 12♂, Tani, Kitadani-chô, Katsuyama-shi, 20-21.vii.2013, TM & HK; 1♀1♂, Nigure, Ohno-shi, 26.vii.2014, TM; 6♂, Kitadani-chô, Katsuyama-

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shi, 20.vii.2013, TM; 2♀, Mizuochi-chô, 22.vii.2014, TM; 1♀, same loc., 28.vii.2014, TM; 1♀, 17.viii.2014, TM; 8♂, Wada-chô, Sabae-shi, 1.vii.2014, TM; 4♀19♂, same loc., 12-17.vii.2014, TM; 2♀, same loc., 3.viii.2014, TM; 1♀, same loc., 3.ix.2013, TM; 2♀, Yamagishi, Mikuni-chô, Sakai-shi, 9-12.vii.2014, TT; 10♂, Usogouchi Tsuruga-shi, 19.vii.2013, TM & HK; 1♀, same loc., 27.vii.2013, TT. Aichi-ken, Honshu: 1♂, Watagari-chô, Toyota-shi, 30.vi.2013, A. Kawazoe (5237-41-33). Ehime-ken, Shikoku: 1♀, Hoko-san, Hakata-jima, 25.vii.2010, S. Hashikoshi.

Diagnosis. Body including legs predominantly black with the following parts yellow: clypeus except in apical part, small median patch on lower frons, antennal scape below, medially interrupted line at anterodorsal margin of pronotum, metanotum, and regular apical bands on metasomal tergites 1 and 2 (♀). Mandible usually entirely black, sometimes slightly with reddish tinge (♀♂). Legs black with fore and mid-tibiae (often also hind tibia) yellow-marked. Clypeus almost as broad as long (CW/CL 1.02) (♀). Area between antennal insertions and ocelli strongly raised (♀). Cephalic foveae distinct, situated in a large transverse excavation (♀). With mesosoma in profile, erect hairs on mesonotum of uniform length, shorter than diameter of anterior ocellus (♀♂).

Female.

Measurements. Body length (head + mesosoma + metasomal tergites 1+2) (n=9): 14.5-17.0mm (mean(m)=15.9mm); head width (n=9): 4.23-4.93mm (m=4.65mm); clypeal width, CW (n=20): 1.84-2.24mm (m=2.07mm); clypeal length, CL (n=20): 0.90-0.98mm (m=0.94mm); CW/CL (n=20): 0.90-0.98mm (m=0.94mm).

Structure and sculpture. Clypeus slightly longer than broad; its anterior margin relatively broadly emarginate at middle, with blunt lateral teeth; clypeus entirely puncto-reticulate with a few irregular ridges running from its base toward apex. Frontal area surrounded by eyes, ocelli and antennal insertions distinctly raised. Cephalic foveal depression large, with anterior margin deeply emarginate; posterior margin very close to occipital margin. Antennal flagellum relatively long; seen from above, first to fourth

flagellomeres longer than broad; others as long as or slightly shorter than broad. Mesoscutum puncto-reticulate; interpuncture ridges tending to run longitudinally; puncto-reticulation coarser on mesoscutellum than on mesoscutum. Dorsolateral part of propodeum anteriorly with distinct transverse rugae; lateral face of propodeum coarsely rugous, without isolated punctures. Punctures around basal area of dorsal face of metasomal tergite 1 much coarser than those in its posterior portion and those on tergite 2; lateral face of tergite 1 with very large punctures that are comparable to posterior ocellus in diameter.

Pilosity. Hairs on raised area of frons weakly curving, as long as or slightly longer than diameter of ocellus; those on vertex and temple suberect or appressed to surface. Clypeus with dense hairs that are slightly downward directed and much shorter than hairs on frons. Gena with very short hairs only. Venter of head with dense long erect hairs. With mesosoma in profile mesoscutum bearing very dense, relatively short hairs of equal length that are much shorter than those on frons; with mesosoma in dorsal view lateral face of pronotum and mesopleuron with short hairs that are at most as long as diameter of ocellus.

Colour pattern. Ground body colour black with the following parts yellowish (Figs. 1, 3): clypeus extensively (W-shaped black marking present in apical portion), triangular marking above frontal keel, minute spot on temple, underside of antennal scape, narrow band (often medially interrupted) on pronotum, parategula, narrow band (rarely interrupted medially) on metanotum (band absent in 25% of examined specimens), regular apical bands on metasomal tergites 1 and 2. Fore wing strongly infuscated; hind wing much paler.

Male.

Measurements. Body length (head + mesosoma + metasomal tergites 1+2) (n=20): 11.0-16.0mm (mean(m)=13.1mm); head width (n=20): 3.60-4.60mm (m=4.00mm); clypeal width, CW (n=70): 1.23-1.75mm (m=1.43mm); clypeal length, CL (n=70): 1.43-2.05mm (m=1.69mm); CW/CL (n=70): 0.81-0.89mm (m=0.84mm).

Structure, pilosity and colour pattern. Very similar to female, with ordinary sexual difference. Body size much more variable than

in female. Clypeus distinctly longer than broad. Frontal area in front of ocellar area more weakly raised than in female. Apical part of aedeagus broader than shaft that widens toward base, with apical margin entire or very indistinctly notched at middle. Erect hairs on frons longer than those of female; some of them longer than diameter of anterior ocellus. Erect hairs on mesoscutum of uniform length, much shorter than those on frons, much less than diameter of anterior ocellus. Colour pattern similar to that of female (Figs. 2, 4) with the following difference. Clypeus entirely yellow. Sinus of eye with short yellow line on lower margin. Yellow marking on metanotum more frequently lost or vestigial (in ca. 45% of examined specimens) than in female. Posterolateral corner of metasomal sternite 2 usually with yellow spot. Apical two to three flagellomeres often with yellowish to brownish areas. Upper faces of fore and mid-tibiae (also often of hind tibia) yellow; apical tarsomere often clear to dirty yellow.

Etymology. The specific epithet *gibbifrons* means 'inflated frons'.

Distribution. JAPAN. Honshu (Chiba Pref., Aichi Pref., Fukui Pref.) and Shikoku (Ehime Pref.).

Taxonomic discussion

The shape of the clypeus is sometimes useful in separating the species (Figs. 3, 4, 5-13). In the female two conditions are observed in the anterior margin of the clypeus. In *A. flavomarginatum*, *A. gibbifrons* sp. n. and *A. melanopterum* the anterior margin is shallowly emarginated with lateral teeth that are apically round. In *A. flavomarginatum* the anterior margin is very shallowly emarginated, sometimes almost truncate and essentially without teeth, although the punctated yellow area is deeply incised (Figs. 9, 13). In the other species the emargination is slightly broader and deeper. On the other hand, *A. flavopunctatum* and *A. inamurai* (see below) have a deeply emarginated anterior margin and apically sharp lateral teeth (Figs. 7, 12). The male clypeus is less useful, but it is very broadly emarginated with sharp lateral teeth in *A. flavopunctatum*.

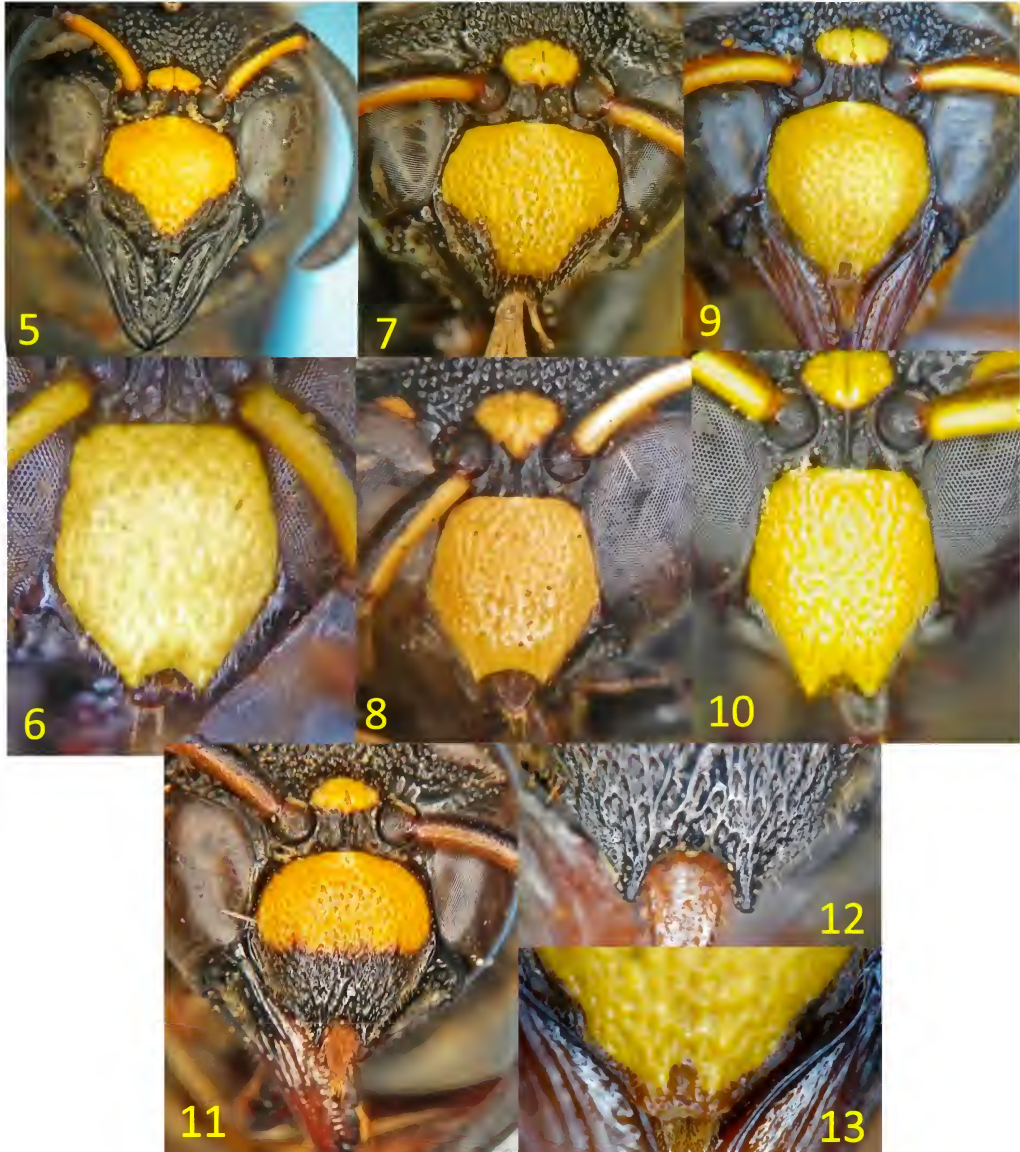
Anterhynchium gibbifrons sp. n. is very

similar to the two previously known species from Japan, i.e., *Anterhynchium flavomarginatum* (Smith, 1852) and *A. melanopterum* Yamane, 1981. In colour pattern it is more similar to *A. melanopterum* than to the Japanese mainland subspecies *micado* (Kirsh, 1878) of *A. flavomarginatum*, but *A. gibbifrons* sp. n. and *A. melanopterum* are very different from each other in pilosity on the mesoscutum, structure of the vertex, and shape of the aedeagus (see 'Key to species'). The new species and *A. flavomarginatum* share the presence of a distinct depression for the cephalic foveae, and shorter and uniform erect hairs on the mesoscutum. However, *A. flavomarginatum* is very distinct in having the apical margin of the clypeus with a narrow and very shallow emargination, and distinctly broadened apical portion of the aedeagus.

The present new species is also similar to *A. flavopunctatum* (Smith, 1852) distributed in the Korean Peninsula and China (see van der Vecht 1963; Giordani Soika 1976; Kim and Yoon 1994; Kim 2014) in both structure and colour pattern. They are, according to the present knowledge, allopatric in distribution. In both the species, the vertex of the female has a distinct depression for cephalic foveae, and the punctures in the dorsobasal part of the metasomal tergite 1 are much larger than those on tergite 2. However, the new species differs from the latter in the following points: clypeus relatively longer (CW/CL 0.90-0.98 vs. 1.00 in ♀, 0.81-0.89 vs. 0.90-0.92 in ♂), with lateral teeth of anterior emargination rounded; frons more distinctly raised (♀); and occipital carina smoothly curved through the entire gena (♀) (in *A. flavopunctatum* a rather distinct angle present). The Korean subspecies *koreanum* Yamane, 1981 of *A. flavomarginatum* is similar in colour pattern to *A. gibbifrons* sp. n. However, in the former, the area in front of the ocellar region is not distinctly elevated (♀), and the dorsolateral faces of the propodeum have a pair of yellow markings (♀, ♂) (see also 'Key to species').

Anterhynchium gibbifrons sp. n. shares some character conditions with other related species as mentioned above, but is very unique in that the frontal area surrounded by eyes, ocelli and antennal insertions is distinctly raised in the

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Figs. 5-13. Clypeus of *Anterhynchium* spp. 5, 6. *A. melanopterum*; 7, 8. *A. flavopunctatum*; 9, 10, 13. *A. flavomarginatum*; 11, 12. *A. inamurai*; 5, 7, 9, 11. Female; 6, 8, 10. Male; 12, 13. Apex of female clypeus.

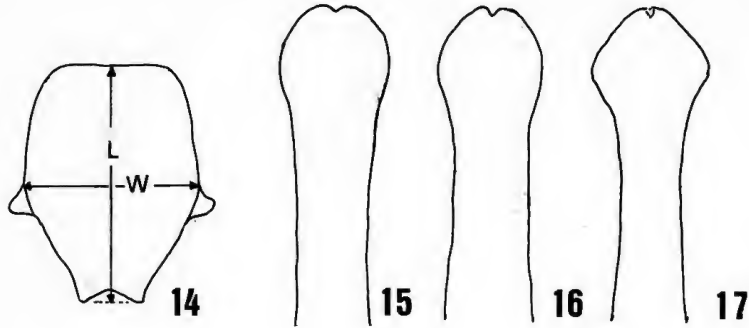


Fig. 14. Measuring points of clypeus (L: length, W: width). 15-17. Dorsal view of aedeagus. 15. *Anterhynchium gibbifrons*; 16. *A. melanopterum*; 17. *A. flavomarginatum*. (16 and 17 after Yamane, 1981)

female.

Distribution and Bionomics

Anterhynchium flavomarginatum is one of the most common tube-renting wasps in Japan (e.g. Iwata, 1938; Yamane, 1990). In many museum collections it can be found in large numbers. On the other hand the close relative *A. melanopterum*, easily recognized by its peculiar colour pattern, is relatively rare elsewhere in Japan and Korea (Yamane, 1990; Kim, 2014). The present new species *A. gibbifrons* should have attracted the eyes of wasp collectors due to the similarity in coloration to the rare species *A. melanopterum*. However, the oldest date for *A. gibbifrons* sp. n. material available is 25 July 2010 (collected on a small island in Setonaikai). During 2013 and 2014 a relatively large number of specimens were collected by several hymenopterists (see ‘Specimens examined’). Although the known localities are concentrated to Fukui Prefecture, Honshu (Fig. 18), the real range should be much wider. Collection sites in Fukui Prefecture ranged from 5 to 573 m in altitude.

Anterhynchium flavomarginatum has one generation per year in Japan (Itino, 1986). Most specimens of *A. gibbifrons* sp. n. have been collected during July and August, although one male was collected in late June and one female in early September. However, females were seen even late September (29 Nov. 2013)

by Mr. T. Tano in Tsuruga-shi. Although the flight season covers more than 3 months, at present this species is also considered to be univoltine. Most collected specimens were visiting flowers of *Ampelopsis glandulosa* (Wall.) Momiy. var. *heterophylla* (Thunb.) Momiy. or *Cayratia japonica* (Thunb.) Gagnep., both belonging to Vitaceae. These two vines commonly grow along the roadside of farmlands and forest edge, representing typical ‘satoyama’ plants, and are very important nectar sources for wasps and other insects. In most collection sites in Fukui Prefecture *A. gibbifrons* sp. n. occurs sympatrically with *A. flavomarginatum*. It is not clear that the remarkable size variation in the body size of *A. gibbifrons* is due to the competition for prey or nectar resources with the latter species.

Notes on *Anterhynchium inamurai* (Sonan, 1937) stat rev.

A. inamurai was originally described in the genus *Rhynchium* based on a single female specimen from Taiwan. Vecht (1963) synonymized it with *A. flavopunctatum*. However, *A. inamurai* is very distinct in having an exceptionally large body size: in the female, body length (head + mesosoma + metasomal tergites 1+2; BL) 19.5-20.0mm, head width (HW) 5.20-5.26mm, forewing length (WL) 18.5-

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19.5mm (BL 14.0-14.5mm, HW ca. 4.33mm, WL ca. 16mm in *A. flavopunctatum*). Furthermore, the anterior excavation of the clypeus is broader and deeper as was illustrated by Sonan (1937, fig. 1). The anterior pronotal band is more developed than in *A. flavopunctatum* and not interrupted medially, and the mesoscutellum as well as metanotum is

marked with orange. All this strongly suggests that this form is to be considered a good species.

We examined the following two specimens from Taiwan: ♀, Nantou Hsien, Kwantau Shi, 21-29.v.1973, So. Yamane leg.; ♀, Tao Yuan Hsien, Pa Lin, 14.viii.1987, K. Baba leg. (identified as *A. flavomarginatum umenoi* by Dr. J. Gusenleitner).

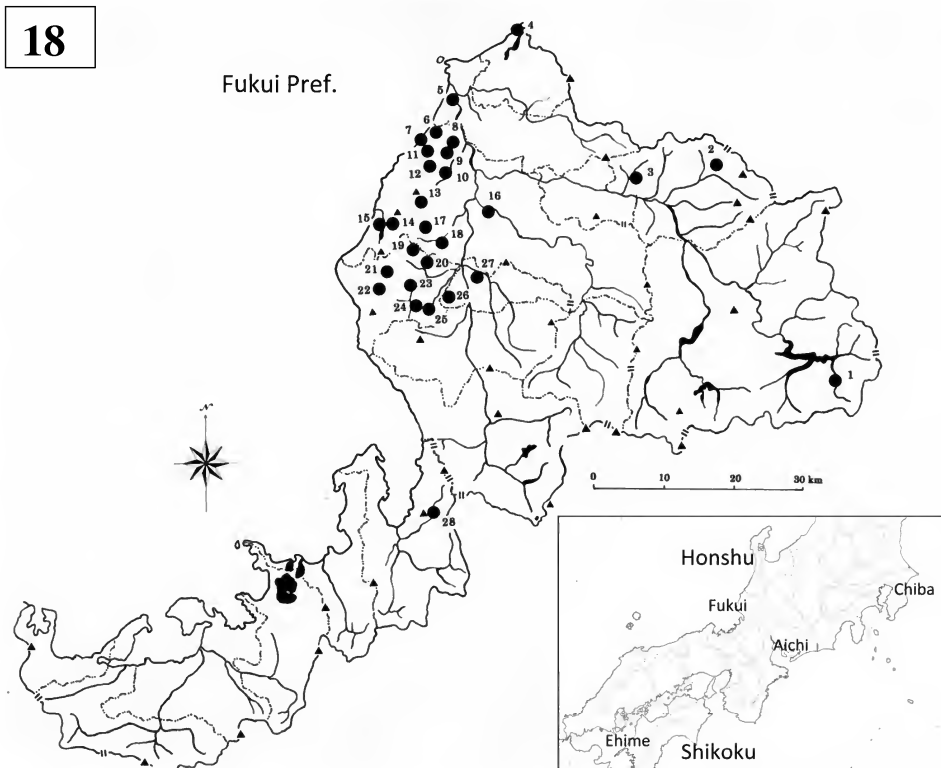


Fig. 18. Distribution of *Anterhynchium gibbifrons* in Fukui Prefecture, Honshu. 1: Ohno-shi; 2, 3: Katsuyama-shi; 4: Awara-shi; 5: Sakai-shi; 6-18: Fukui-shi; 19-25: Echizen-chô; 26, 27: Sabae-shi; 28: Tsuruga-shi.

Key to Northeast Asian Anterhynchium species

1. Standing hairs on mesonotum soft and long, slightly waving, similar in type to those on frons and vertex (♀, ♂). Depression bearing cephalic foveae obscure or essentially absent (♀). Clypeus broader than long, with CW/CL 1.07-1.09 (♀). Aedeagal shaft only slightly narrower than aedeagal tip (♂).....
**A. melanopterum Yamane**
 (China, Korean Peninsula, Japan)
- Standing hairs on mesonotum stiffer and shorter, of uniform length, distinctly different in type from those on frons and vertex (♀, ♂). Large depression present on vertex, bearing foveae (♀). Clypeus as long as or longer than broad, with CW/CL generally less than 1.0 (♀). Aedeagal shaft variable in shape (♂).....2
2. Punctures around dorsobasal part of metasomal tergite 1 as large as those in posterior half of tergite 1 and those on tergite 2 (♀, ♂). Female clypeus distinctly longer than broad (CW/CL: 0.89-0.95, generally less than 0.92); its apical emargination narrow and shallow. Pronotum (in addition to narrow anterior band), mesopleuron and mesoscutellum generally with yellow to orange maculae (in the specimens from the Nansei Islands in Japan yellow or orange maculae much more abundant). Apical part of aedeagus distinctly broadened, much broader than shaft (♂).....
**A. flavomarginatum (Smith)**
 (Southeast Asia, China, Korean Peninsula, Japan)
- Punctures around dorsobasal part of metasomal tergite 1 much larger than those in posterior half of tergite 1 and those on tergite 2 (♀, ♂). Female clypeus as long as broad or slightly longer than broad (CW/CL: 0.90-1.00, generally more than 0.93); its apex more broadly emarginate. Pronotum, mesopleuron and mesoscutellum generally without yellow to orange maculae (pronotum often with narrow anterior band). Apical portion of aedeagus slightly broader than shaft in *A. gibbifrons* sp. n. (this character is not known for *A. flavopunctatum*).....3
3. Frontal area surrounded by ocellar region, upper lobes of eyes and yellow frontal

marking only weakly raised. Clypeus almost as broad as long in female (CW/CH: 1.00); its apex rather deeply emarginated with sharp lateral teeth; male clypeus moderately longer than broad (CW/CH: 0.90-0.92). Occipital carina with distinct bent on gena (♀).....**A. flavopunctatum (Smith)**
 (China, Korean Peninsula)

- Frontal area surrounded by ocellar region, upper lobes of eyes and yellow frontal marking strongly raised. Clypeus slightly longer than broad in female (CW/CH 0.90-0.98, mean=0.94); its apex relatively shallowly emarginate with blunt lateral teeth; male clypeus distinctly longer than broad (CW/CH ca. 0.81-0.89, mean=0.84). Occipital carina smoothly curved on gena (♀).**A. gibbifrons sp. n.** (Japan)

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